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\* INDIANA SINCLAIR-TIMEX NEWSLETTER \*  
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Editor-Frank Davis  
Assist - M. Felerski

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I.S.T.U.G. MEETING

A reminder that Full Membership is ~~still~~ only \$10.00 per year and that Associate Membership is still \$7.50 per year.

For those few who have not renewed their membership as of yet, and there are only three of you, allow me to prod you once more to do so in the real near future. Things are just about to be exciting. June they will be going up to \$9.00 for Associate Member and to \$12.00 for Full Membership. Pay up now and avoid the only price increase we have ever had. Remember...we send out our newsletter First Class, not bulk rate mail (which can mean up to a six week wait on delivery)! We have picked up 7 new members in the last four months (so we are not a dead or dying group) and now just need to get more of you to attend some meetings. The last meeting saw Basil Wentworth, Ralph McCrum, Willie Jones, Paul Holmgren, Charlie Wilson, Ted Heckman, Curtis Williams, and Frank Davis. We have had other inquiries about joining, both in and out of state. At the last meeting we discussed newsletters that we exchange with, to other groups and the newsletters we get in exchange. We reviewed some Spectrum and Sinclair mags from England and Germany. Everyone was urged to join and support SNUG. Write to me for more info, or to Paul Holmgren. And last but not least we made a couple of hardware mods to Charlie Wilsons QL, to help it avoid any possible overheating and to allow it to have more peripherals hanging on it without worry of the power dropping out.

The next meeting will be held at the Indianapolis State Fairgrounds. We are going to a Ham Radio Show. Many of us went to this show in 1988 and found it a great place to pick up disk drives, computer monitors, disks, tapes, power supplies, etc. The meeting will be held on March 12th. We will all meet at 10 A.M. at the Teepee in the Fairgrounds and go on over as a group. If you need help in deciding what to buy, you will have the support of the group. For any directions to this place call Paul Holmgren at 317-291-6002, or call Willie Jones at 317-897-9225. There are snack stands for lunch and plenty of Ham and computer deals to be had by all, so I hope to see at least 20 of you there. The Fairgrounds is 1600 E. 38th Street in Indianapolis. When we meet before going into the Hamfest we will have a short meeting, and spend the rest of the time searching for bargains. Give me a call if you have any questions about what can be had at such a show. I, Frank Davis, can usually be reached evenings or weekends at 317-473-8031.

by Frank Davis

I recently told about an IBM emulator available for the QL. If you did not go out and immediately order it, then this should have worked to your advantage. The first ones shipped turned out to have a few bugs in them. This should have been corrected by now, but check with RMG or SHARPS before you order these and find out about availability. Tom Bent is back in business doing upgrades and mods on QLs. I will let you know what I think of these changes in the near future as I have one that has had the treatment on its way back to me. Paul Holmgren and Bill Angel have had this done to their QLs and were pleased.

While speaking with Tom Bent he told me that the price that Cambridge Computer is asking for the Z88 has been lowered. Sounds interesting...check out their ad in this issue. They have told me that as a User Group we can get a discount, so if you are interested give me a call at 317-473-8031 and I will check this out for you. I would like to have a review of the Z88 done by one of our readers. Any takers on this?

I received a letter last week from David Zimmerman, the last President and Editor for ATSU, the Columbus, Ohio users group. They are no longer active as a Timex-Sinclair group and have requested that I let users and other user groups know this, as they do not have a newsletter to exchange. I will miss having David as an active TSer, as he was of great help to Jack Roberts and I when we put on the First Midwest Timex-Sinclair Computer Fest (that is what we called it then, rather than Conference, as it is now called). He and his group provided a lot of man hours on this show and we had some help from them when Paul Holmgren and I put on the Second Midwest Timex-Sinclair Computer Fest at Indianapolis. Those still wanting to contact Dave can do so on Compuserve, where he still keeps an eye on the QL. He has gone on to use an Amiga most of the time.

Those who use a TS2068 should send a large self-addressed stamped envelope to Stan Lemke at Lemke Software, 2144 White Oak, Wichita, Kansas 67207. He has produced some excellent graphics and desktop publishing programs for the TS2068. Get a copy of his catalog and order. He also has been offering a 32K dock port board that you can use to bankswitch with. I have not used his board, but the one (no longer offered) Tom Woods offered a couple of years ago. This type of board is an excellent place to put utilities and BASIC programs, and once you get used to it, you will not want to do without it. Give your TS2068 some more memory! He also offers some excellent programs by Bill Ferree in his catalog. The dealers that you support are going to be the ones you will have and those you do not will not be there! There will always be exceptions to this rule, such as Quantum Computing.

Those individuals and User Groups waiting to receive copies of our Public Domain programs on tape, please bear with me a little longer; it has taken far longer to put these back to tape for the TS2068 and Spectrum than anticipated. We had them all on disk on Oliger Format and had forgotten how many do not yet have an Oliger Disk Interface and are using tape or some other format. When the masters are all done, the copying will be swift and they will go out first class mail. I need to get in contact with SLIX in California as they tell me in their newsletter that they are able to read and write to Larken, Oliger and MS-DOS disks on their QLs. This could be of great assistance to me and to all of you out there.

## Tricks of the Trade: Converting VU-3D

The conversion of TS2068 VU-3D to run on a Spectrum Emulated TS2068 with a Rotronics Wafadrive turned out to be the most interesting and enjoyable conversion for me to date. What made it so much fun was the ability to produce screen dumps to my full size printer in three different sizes. All of the screen dumping (COPYing) was done through the Rotronics Toolkit Wafer DRAW\* command.

Since I have brought up this command before, I thought I might discuss it here before I list the conversion. The DRAW\* command comes from the Rotronics Toolkit Wafer and can be found with the file name DRAW DX-85. Upon loading the code, it is relocated from the Display RAM to the Printer Buffer and is automatically initialized. This means that the command DRAW\* is placed in the command list. Three new System Variables are added to change the output of this Epson compatible routine.

The first is Scale whose value is changed by POKing a value of 1, 2 or 3 into location 23296. A value of 1 produces a 1x1 (dots per pixel) printout. A value of 2 gives a 2x2 image and a 3 produces a 3x2 image which is the most proportionally correct.

The second variable is the left margin position at location 23297. The default value I found to work the best was 5. The third variable at location 23298 is the Mode and holds the value of the character code to set your printer for graphics mode. This is normally set to "L".

If you are a Wafadrive owner with an Epson compatible printer and you do not own a copy of the Rotronics Toolkit Wafer, the DRAW\* code was published in the Wafadrive Engineering Bulletin. As of this writing I have no word as to whether or not we can publish the code here, since both companies who sold the Toolkit and Bulletin are now defunct.

Unlike my previous conversion articles, the entire BASIC listing of the VU-3D program will appear at the end of the article. As in the other conversions, we initialize the system and LOAD "VU-3D", then BREAK it when it begins to LOAD it's SCREEN\$ code. Next we need to execute an INK 7 so we can view the listing. We then make the following changes to lines 1, 9, 11, 12, 14 and add lines 15 & 16.

Line 1 receives a CAT\* command before the input statement.

Line 9 now does a LOAD\*"VU 3D" to load the vu-3d CODE. Then it LOAD\*s the DRAW\* CODE, called "COPY CODE" (see VU-Calc conversion article). Also, the load of the SCREEN\$ file has been removed.

Lines 11 and 12 become SAVE\*, with the removal of the token CODE from line 12 and replacing it with a "," (comma).

Line 16 is a copy of the original line 14 with the addition of the POKE command at the beginning of the line for printout size.

Lines 14 & 15 are new and are used to select the size of the printout which is POKed in line 16. The second AT in line 14 is to clear the second VU-3D command line, and consists of 32 Space characters.

Once the changes have been made, save the BASIC program using:

SAVE \*"VU-3D" LINE 9: VERIFY \*"VU-3D": CAT \*

Then LOAD "vu-3d" CODE and save it with

SAVE \*"VU 3D",30720,34815

Now just a few notes on the program:

The diagrams, and machine code to produce them are all contained within the CODE, therefore a "Data Save" will be 35K long.

There seems to be enough room to add more BASIC if you wish, but don't push it. I recently lost a great conversion by stuffing too much BASIC into it making it crash.

Be careful with input. Lines 14 & 15 were designed not to destroy the "MAG., ROT., Z" information on the bottom line of the display.

The listing is below and contains everything discussed above. Remember that the DRAW\* code needs to be loaded first before putting the DRAW\* command into the line. If you don't have the DRAW\* code, just leave line 14 alone and do not add lines 15 and 16.

```
1 CAT *: INPUT "Filename ? "; LINE A$: LET N$=A$: RETURN
2 RETURN
3 GO SUB SGN PI: IF NOT LEN A$ THEN GO TO SGN PI
5 RETURN
9 CLEAR VAL "30719": DIM N$(VAL "8"): POKE VAL "23624",VAL "9": BORDER SGN PI
: INK VAL "7": PAPER SGN PI: CLS : PRINT AT VAL "16",RND: LOAD *"VU 3D": LOAD *"
COPY CODE": GO SUB VAL "10+USR 30720"
10 GO SUB VAL "10+USR 30725": GO TO PI*PI
11 GO SUB PI: SAVE *N$SCREEN$: RETURN
12 GO SUB PI: SAVE *N$,VAL "30720",VAL "34815": RETURN
13 GO SUB SGN PI: LOAD *N$: RETURN
14 PRINT AT VAL "0",VAL "10": "<Size 1,2,3?>";AT VAL "1",VAL "0": "
"
15 LET S=CODE (INKEY$)-48: IF S<VAL "0" OR S>VAL "4" THEN GO TO VAL "15"
16 POKE VAL "23296",S: PRINT AT VAL "21",RND;#RND''': DRAW *: CLS : RETURN
```



## T/S 1000 COMPUTER SALE !!

1000 Computer....\$22.95    W/16k Ram...\$28.95

1000 Computer w/8 Pieces of S/W..... 28.95

1000 Computer w 16k & 8 S/W..... 34.95

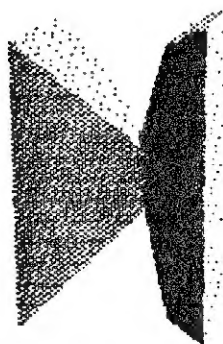
MINDWARE PRINTERS..... \$19.95

Plugs on the the back....16 Col. Wide...Add. Mach.

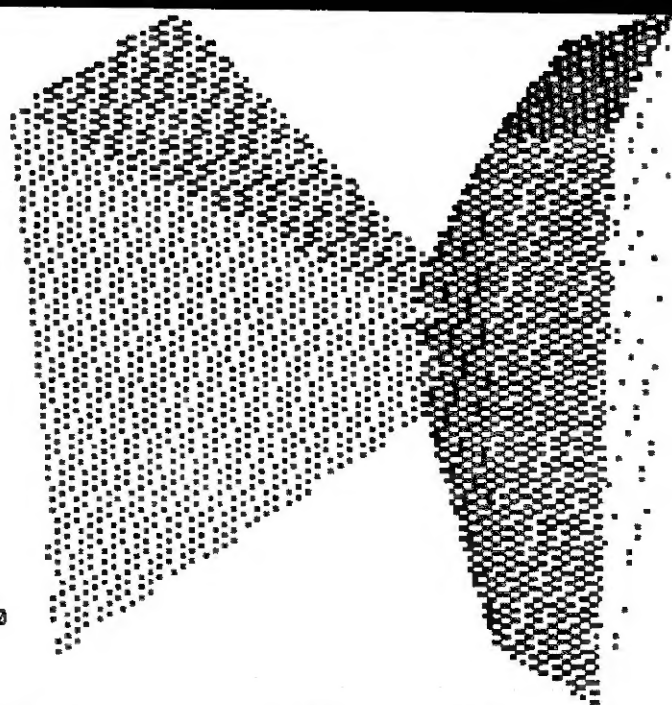
Paper.    HURRY WHILE THEY LAST!

All Complete with Manual, Power Supply, Etc...  
In Original Boxes !!(Sorry, Sold 'AS IS' Only.)

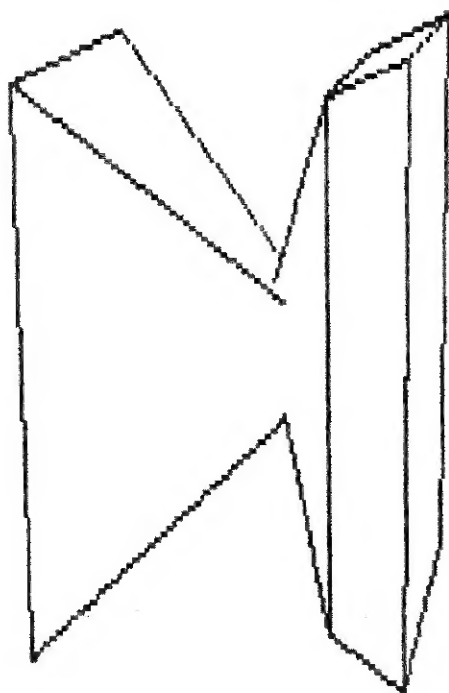
1-602-978-2902



MAG=003.91 ROT 105,014 Z=+00390



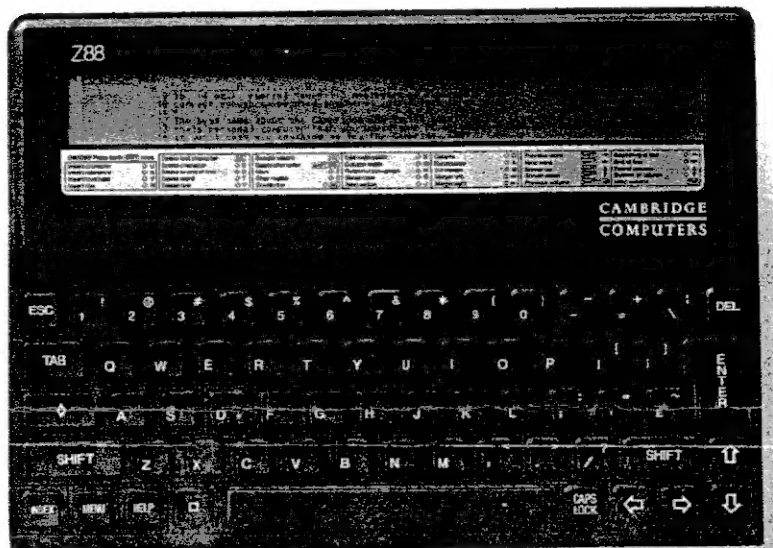
MAG=003.91 ROT 105,021 Z=+00390



MAG=003.91 ROT 105,014 Z=+00390

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### not the average personal computer.

The Cambridge Z88 wasn't designed to be the average personal computer. In fact, the Cambridge Z88 is the first in a new generation of personal computers, unlike any computer ever seen before.

Operating without disks or a disk operating system, the Z88's internal software enables you to move easily from task to task without booting, loading, opening, saving or quitting. Replaceable solid state Memory Cartridges™ add to memory capacity, operating ease and program capacity.

Designed by Clive Sinclair who introduced the breakthrough Sinclair ZX80, 81 and QL, the Cambridge Z88 is compact, lightweight, and powerful enough to be used anywhere; just switch it on.

The best news about the Cambridge Z88 is the price; you pay less for this personal computer than you would for some PC software and peripherals—\$599.00. And it won't cost you anything to try the Cambridge Z88 yourself.

#### Architecture

The Cambridge Z88 is designed with four chips: a CMOS Z80; a 32K RAM (expandable to over three megabytes); a 128K ROM for the operating system, powerful BASIC, and built-in applications (word processor, spreadsheet, daily date manager, etc.); and custom controller chip.

#### Memory

The Cambridge Z88's memory is expandable with replaceable solid state RAM and EPROM Memory Cartridges™ that fit into three easy to access slots under the keyboard. The EPROM cartridges retain their contents when removed from the Z88.

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With *Instant On™*, there's no booting, loading, opening, saving, or quitting. When you want to work on a new task, press the INDEX key to display a list of applications and files; then select one. The task you were working on will be instantly saved. Switched off, the Z88 automatically saves your work; turn it on again, everything appears exactly as you left it.

#### Operating features

**Display:** 8 lines by 106 column supertwist LCD display with 80 columns of work area, including page map with a view of the entire page and command menus.

**Keyboard:** A full sized, easy to use QWERTY keyboard with silent travel keys. Context sensitive command menus can be opened to display all of the available commands and their keyboard equivalents.

#### Communications

The Z88 has an RS232 port for a printer (serial and parallel cables are available), modem, and a PCLink enabling ASCII, Wordstar, and Lotus 1-2-3 files to be transferred to and from your PC.



Memory Cartridges™ are available in 32K, 128K, and 512K

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Recreational Mathematics on the ZX-80!  
by Steven Petrovic

The majority of applications that our beloved T/S computers are used for have long outgrown the limitations of the 4K ZX-80. However, one interesting application that is worth dragging out the old relic for is the area of recreational mathematics. One aspect of recreational mathematics involves the discovery of D.R. Kaprekar's "Harshad" numbers.<sup>1</sup>

Kaprekar defines a Harshad number as being an integer which is divisible by the sum of its digits. For example, if the integer is 153, the sum of the digits equals nine ( $1+5+3=9$ ). Since a factor of 153 is nine ( $153/9=17$ ), 153 is a Harshad number.

It is a very straightforward task to develop a short routine to find all Harshad numbers ( $<32766$ ) for any given digit sum on the ZX-80. The program listing is given below;

```
15 PRINT "INPUT DESIRED SUM"
20 INPUT D
22 CLS
23 PRINT " (23 spaces) SUM = ";D
25 FOR N = 1 TO 32766
27 LET S=0
30 LET X$ = STR$(N)
35 LET S=S+CODE(X$)-26
37 IF S>D THEN GO TO 100
40 LET X$=TL$(X$)
50 IF X$>"" THEN GO TO 35
60 IF NOT D=S THEN GO TO 100
65 LET E=N/S
70 IF N=E*S THEN PRINT N,
100 NEXT N
```

Harshad, according to Kaprekar, is a Sanskrit word which means "giving joy". Discovering the properties of these numbers has certainly been quite intriguing and an exercise in programming in the original Sinclair BASIC vernacular. Below is a listing for the T/S 1000 in case there is no dusty ZX-80 lying around. Happy computing!

```
10 PRINT "INPUT DESIRED SUM"
20 INPUT D
25 CLS
30 PRINT "SUM = ";D
35 FOR N=1 TO 1E08
40 LET SUM=0
45 LET X$=STR$(N)
50 FOR X=1 TO LEN X$
55 LET SUM=SUM+CODE X$(X)-28
60 IF SUM>D THEN GOTO 100
65 NEXT X
70 LET F=N/D
75 LET E=N/SUM
80 LET E=INT E
85 IF E=F THEN PRINT N,
100 NEXT N
```

1. D.R. Kaprekar, J. Recreational Math., 13(1), 1980-81, p.2



MAY 5 6 7

Poll: 1989  
Timex Sinclair

# CapitalFest

## ( ) It'll Never Work

- \* We are orphans - Nobody wants us.
- \* We have been disappointed in the past.
- \* Timex owners are cheap!
- \* I'm going to stew at home next spring.

HOWARD JOHNSON'S  
NEW CARROLLTON,  
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ROUTES 450 & 95  
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## ( ) It CAN Work!!

- \* Indianapolis worked!
- \* We have a central location on the East coast.
- \* We are going after the biggest names for our seminars.
- \* We can offer non-computerist spouses and children a variety of alternate diversions.
- \* We are doing our homework - Two preliminary mailings to 5000 known QL owners and over 5000, 2068 and 1000 owners.
- \* We are accessible, with a 24 hour bulletin board for fest information: (301) 588-0579.
- \* The attendees of such a convention are the most active and influential in the community. Word of a product they have seen here will spread across the country.

**AND YOU CAN BE HERE TOO!!**



Dear Survivor,

The enclosed article regarding expanded bank switching is of such importance that I am sending it to several news letters to avoid delay with exchanges.

It is high time that memory and back-plane expansions become available and known.

The WIDJUP Co. is thereby making the original design public in the hope that it will get the ball rolling.

In the interest of economy and availability, two items should be accepted as an interim standard.

1. Back-Plane      EVEREX SYSTEMS INC. EV-1085
2. Adapter        WIDJUP Co. (Design)

This back-plane is a standard PC expansion board having eight slots; one of which must be used for the BSC. There is no need to make things difficult.

The adapter plugs into the rear connector and has the usual feed-thru. It has a cable take-off for connection to the BSC card, and some other convenience features. Design information will be available from the WIDJUP Co. It is hoped that someone will produce it. Prototypes have been made and examined at conventions for a couple of years, so this item should be nothing new.

There is one more thing that should be standardized, though the reasoning for it is not immediately evident. The pin assignments for the back-plane, being arbitrary anyway, will correspond closely with the IBM bus. The reason?

The BSC can easily be modified for use with some PC clone cards. Why not have upward compatibility right from the start. This is NOT a plug for IBM or the PC clones! It is a simple economy measure which is in the interest of all TS2068 supporters. There is no easier way to get ports, timers, and modems than this.

It will be a long time before users will be ready for a full-fledged auto-configuring system with a DAISY CHAIN, and the advanced BSC that requires, if ever. Hopefully a clone will come along having this built in. If anyone is doing that, I beg him to contact me. It EXISTS, regardless of what people have been saying. (It requires the EVEREX expansion board for the AT or equivalent.)

Don't let this revolutionary development get away!

Mr. William J. Pedersen  
1120 Merrifield S.E.  
Grand Rapids, MI 49507  
The WIDJUP Co.

## APPENDIX A

When the clock is speeded up to the point when memory boards cannot keep up, a "hold it!" signal can tell the system to give it more time until it catches up. This is called HOLD or WAIT, depending on the processor (WAIT for the Z80).

In a system where other bus masters like DMA controllers are present, and there is a good chance some of them will be too fast for the memory, the memory board must issue WAIT until it has responded properly.

Most of the time a bus master will not be kept waiting because the WAIT pulse has vanished by the time it is checked.

Referring to Figure 2, the active low BE signal can be used to trigger a one-shot flip-flop to generate a short delay pulse. Clock cycle delays cannot be used because there is no way to tell in advance how fast the clock will be running (which was the problem to begin with). The only advantage of clock cycle delays is when a known clock speed is too fast, and slow-poke memory chips are used to save money. Even in that case, the one-shot method is more efficient. Exceptions exist where memory boards contain their own clocks. Core and dynamic memory controller refresh boards belong to this category, and are intermediate in efficiency because of a random synchronization delay as well.

When polling for the presence of devices with the goal of mapping system configuration, neither the WAIT nor BE signals are of any use. In order to read bank status there must be an I/O port on each reporting device which is keyed to the bank number. The BSC drives the extended address from the selected bank number instead of CCOT. The data returned could be anything, but interrupt pending status and whether the bank is even there are both mandatory information. These bits must be active low in case nothing is there. During this read, it is the BSC which pulls up the data bus. Device status registers use open collector TTL. An I/O write to a bank resets the interrupt pending register. This will also reset the INTerrupt bus signal if no other devices have interrupts pending. Interrupts issued by devices not currently owning chunks are easily found this way so their banks can be enabled to handle the interrupt. A bank number list is used to service interrupts in priority sequence. An interrupt not found in a configured bank or for the keyboard means that a new device has come on line and the auto-configure procedure must be done again.

When a DAISY CHAIN is used, the Bank # dip switches are replaced with a write-only and clear I/O port register so each card can be assigned a unique "name". This I/O port is enabled by the status of the DAISY CHAIN. A global I/O write resets both the DAISY CHAIN and the "name" registers. Bank # 0 cannot be used with a DAISY CHAIN system and special provisions are needed when HOME and EXROM are relocated anywhere but the cartridge slot or equivalent.

Once the current DAISY is named, it can be addressed directly to read status, and written to if applicable. When a nonexistent Daisy is given a name and then asked for status, there is no answer of course. This signals the end of the CHAIN.